



A.D. 1872, 30th AUGUST. N° 2575.

SPECIFICATION

OF

JOHN THOMAS.

VENTILATING AND CONSUMING SMOKE
IN STOVE HOLES, &c.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, SOLEPORT.

1722 6d.

1873.



A.D. 1872, 30th AUGUST. N° 2575.

Ventilating and Consuming Smoke in Stoke Holes, &c.

LETTERS PATENT to John Thomas, of Middlesbrough, in the County of York, for the Invention of “**IMPROVEMENTS IN THE MEANS AND APPARATUS FOR HEATING STEAM BOILERS, CONSUMING SMOKE, AND VENTILATING THE STOKE HOLES, ENGINE ROOMS, OR OTHER PARTS OF STEAM SHIPS.**”

Sealed the 7th January 1873, and dated the 30th August 1872.

PROVISIONAL SPECIFICATION left by the said John Thomas at the Office of the Commissioners of Patents, with his Petition, on the 30th August 1872.

I, JOHN THOMAS, of Middlesbrough, in the County of York, do
5 hereby declare the nature of the said Invention for “**IMPROVEMENTS IN THE MEANS AND APPARATUS FOR HEATING STEAM BOILERS, CONSUMING SMOKE, AND VENTILATING THE STOKE HOLES, ENGINE ROOMS, OR OTHER PARTS OF STEAM SHIPS,**”
to be as follows :—

The principal objects of my Invention are the ventilation of the stoke
10 holes and engine rooms of steam ships, and the perfect combustion of the gases and smoke, and thereby the saving of fuel.

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

I carry out my Invention as follows:—I make an iron door and frame, and properly fix the same to the ash hole of the boiler. They must be made air-tight against the boiler, and there must be a branch pipe through the frame, and I connect a pipe to the branch for leading air into the ash hole under the furnace bars. I build the fire-bridge 5 with perforated bricks, which bricks I build on hollow iron bearers, so that the perforations are in direct communication with the ash hole; or, if preferred, I lay a perforated pipe within the brickwork of the fire-bridge with proper openings for the emission of air through the bridge, so that the air may intercept the gas and smoke that evolve from the 10 fire on the grate. I then make an iron casing for encasing the chimney, and this casing must be large enough to leave a clear space between it and the chimney of from four to six inches all round.

The casing may be of any convenient height, but commencing it at or near the smoke box, and continuing it up through the upper deck and 15 six or eight feet above, will be found in practice sufficient for my purpose. I firmly fasten the casing to the chimney, both at the lower and upper part of the same, and in or near the upper end of the casing I make a hole of sufficient size for letting air into it, and at the bottom of the casing I make a similar hole for conveying the air to the fires. I make 20 a pipe with as many branches or outlets as there are fires in or under the boilers, and I set this pipe in a horizontal position over the boilers, or if convenient I pass it through the smoke box, and I connect this pipe to the hole in the casing, and I also connect it with the branches in the ash hole frame, and in each of these pipes, which connect to the ash 25 holes under the grate, I fix a valve to regulate the admission of air. I then attach a machine for exhausting and blowing air, which machine may be of the cylinder or force blast form or fan machine, or any of the various machines now in use for blowing air, and I either connect this machine to the propelling engines of the ship or I erect a small engine 30 specially for driving the same. I connect a pipe to the air inlets of the blowing machine, and lead the same to the stoke hole, engine room, or any part of the ship that needs ventilation. Flexible tubes may be led from a branch on this pipe to any part of the ship. I also fix a pipe to the air outlet of the exhausting blowing machine, and carry this pipe up 35 and connect it to the hole in the upper part of the casing that surrounds the chimney; on this pipe I fix a valve for letting off any surplus air,

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

so as not to drive any more air into the casing than may be required for combustion.

Having fixed my apparatus I proceed to light the fires in the boilers, and to do this I open the ash hole doors, and let the chimney draw air
5 through the grate in the ordinary way; and when the steam is up high enough to start the engines I close the ash hole doors, and set on the exhausting blower, and it will draw or exhaust the vitiated air from the stoke hole or from any part where the inlet pipe may be led, and as fast as the vitiated air is drawn off good air will descend to occupy its
10 place. The machine will blow the vitiated air up into the casing; the heat that is radiated by the chimney will be taken up by this air, and the heated air will enter the ash hole; a part of it will pass up through the fuel on the bars, and the other part will pass up through the perforations of the bridge; the heated air that rises up through the
15 bridge will enter into immediate combustion with the gases evolved from the grate, and will perfectly consume the smoke, and the air being supplied to the ash hole under pressure will more effectually consume the small cinders that ordinarily fall through the grate bars unconsumed. To work this apparatus it will be necessary to regulate the
20 admission of air to the fire-places, and to keep some loose clinkers on the furnace bars, and a thick coal fire on them, and to regulate the chimney damper so as to exhaust the flame and heat in and around the boilers.

I have herein-before described the working of the exhausted blower
25 by the power of the propelling engines of the ship, but I would prefer to erect a small special engine for driving the same, and to get the steam from the auxiliary boiler, where there is one. In this way the main boiler fires may be lighted, and steam got up in half the time by the aid of the blowing machine forcing air in through the fire on the
30 grate, and up through the fire-bridge; the great quantity of smoke will thus be prevented.

The important feature of this Invention is the drawing or exhausting of the vitiated air from the stoke hole, or any other part of the ship, and the sending with the same machine of the air so exhausted to the
35 chimney to be heated, and from the chimney to the fire-places to support combustion.

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said John Thomas in the Great Seal Patent Office on the 26th February 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN THOMAS, of Middlesbrough, in the County of York, send greeting. 5

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Thirtieth day of August, in the year of our Lord One thousand eight hundred and seventy-two, in the thirty-sixth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Thomas, Her special licence that I, 10 the said John Thomas, my executors, administrators, and assigns, or such others as I, the said John Thomas, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the 15 United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN THE MEANS AND APPARATUS FOR HEATING STEAM BOILERS, CONSUMING SMOKE, AND VENTILATING THE STOKE HOLES, ENGINES ROOMS, OR OTHER PARTS OF STEAM SHIPS,**" upon the condition (amongst others) that I, the said John Thomas, my executors or 20 administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the 25 said Letters Patent.

NOW KNOW YE, that I, the said John Thomas, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, reference being had to the accompanying 30 Drawings, that is to say :—

The principal objects of my Invention are the ventilation of the stoke holes and engine rooms of steam ships, and the perfect combustion of the gases and smoke, and thereby the saving of fuel.

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

I carry out my Invention as follows :—I make an iron door and frame, and properly fix the same to the ash hole of the boiler. They must fit tight against the boiler, and there must be a branch pipe through the frame, and I connect a pipe to the branch for leading air into the ash hole
5 under the furnace bars. I build the fire-bridge with perforated bricks, which bricks I build on hollow iron bearers, so that the perforations are in direct communication with the ash hole ; or, if preferred, I lay a perforated pipe within the brickwork of the fire-bridge with proper openings for the emission of air through the bridge, so that the air may intercept
10 the gas and smoke that evolve from the fire on the grate. I then make an iron casing for encasing the chimney, and this casing must be large enough to leave a clear space between it and the chimney of from four to six inches all around.

The casing may be of any convenient height, but commencing it at or
15 near the smoke box, and continuing it up through the upper deck, and six or eight above, will be found in practice sufficient for my purpose. I firmly fasten the casing to the chimney, both at the lower and upper part of the same, and in or near the upper end of the casing I make a hole of sufficient size for letting air into it, and at the bottom of the
20 casing I make a similar hole for conveying the air to the fires. I make a pipe with as many branches or outlets as there are fires in or under the boilers, and I set this pipe in a horizontal position over the boilers, or if convenient I pass it through the smoke box, and I connect this pipe in the casing ; and I also connect it with the branches in the ash hole
25 frame, and in each of these pipes, which connect to the ash holes under the grate, I fix a valve to regulate the admission of air. I then attach a machine for exhausting and blowing air, which machine may be of the cylinder or force blast form or fan machine, or any of the various machines now in use for blowing air, and I either connect this
30 machine to the propelling engines of the ship or I erect a small engine specially for driving the same. I connect a pipe to the air inlets of the blowing machine, and lead the same to the stoke hole, engine room, or any part of the ship that needs ventilation. Flexible tubes may be led from a branch on this pipe to any part of the ship. I also fix a pipe to
35 the air outlet of the exhausting blowing machine, and carry this pipe up and connect it to the hole in the upper part of the casing that surrounds the chimney ; on this pipe I fix a valve for letting off any surplus air, so

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

as not to drive any more air into the casing than may be required for combustion.

Having fixed my apparatus I proceed to light the fires in the boilers, and to do this I open the ash hole doors, and let the chimney draw air through the grate in the ordinary way, and when the steam is up high 5 enough to start the engines I close the ash hole doors, and set on the exhausting blower, and it will draw or exhaust the vitiated air from the stoke hole, or from any part where the inlet pipe may be led; and as fast as the vitiated air is drawn off good air will descend to occupy its place. The machine will blow the vitiated air up into the casing; the 10 heat that is radiated by the chimney will be taken up by this air, and the heated air will enter the ash hole; a part of it will pass up through the fuel on the bars, and the other part will pass up through the perforations of the bridge; the heated air that rises up through the bridge will enter into immediate combustion with the gases evolved from 15 the grate, and will perfectly consume the smoke, and the air being supplied to the ash hole under pressure will more effectually consume the small cinders that ordinarily fall through the grate bars unconsumed. To work this apparatus it will be necessary to regulate the admission of air to the fire-places, and to keep some loose clinkers on 20 the furnace bars, and a thick coal fire on them, and to regulate the chimney damper so as to exhaust the flame and heat in and around the boilers.

I have herein-before described the working of the exhausting blower by the power of the propelling engines of the ship, but I would prefer to 25 erect a small special engine for driving the same, and to get the steam from the auxiliary boiler, where there is one. In this way the main boiler fires may be lighted, and steam got up in half the time by the aid of the blowing machine forcing air in through the fire on the grate, and up through the fire-bridge; the great quantity of smoke will thus be 30 prevented.

Figure 1 of the annexed Drawings is a midship section, and Figure 2 is a longitudinal section of a steam ship provided with apparatus constructed according to my Invention.

A is an air-tight casing around the chimney, and secured to the 35 chimney at its top and bottom ends; a space of from 4 to 6 inches is left

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

between the chimney and casing all round ; A¹, A¹, are pipes carried transversely through the chimney from the casing A, so as the better to extract the heat from the gases which pass up the chimney ; B, B, are a pair of ordinary marine boilers ; C is the smoke box or up-take to the
5 chimney ; D is the delivery pipe to the casing A from the exhausting fan F ; E, E, are the hot air delivery pipes to the ash-pits, which ash-pits are supplied with doors, while the pipes are furnished with throttle valves for regulating the quantity of blast to each furnace ; G is the suction pipe from the stoke hole to the exhausting fan F, through which
10 pipe the bad air is drawn to be subsequently discharged into the pipe D, as herein-before described. The surplus air not required for consuming the smoke is discharged overboard through the pipe H. Pipes may be connected to the suction pipe G, and led to any part of the ship requiring ventilation. I is the fire-bridge formed of perforated bricks ; K is a
15 small cylinder for operating the fan.

Instead of furnace bars I prefer to use what I term a water grate, as seen in vertical section at L, in Figure 2, and shewn separately in plan on a larger scale in Figure 3. This water grate is a box made of boiler plates to the form shewn, all the edges being welded, and made perfectly
20 water tight. It has a number of tube stays *a*, which are screwed through the top and bottom plates ; the hot air from the chimney casing passes up through these tubes into the fire. *b* is an inlet pipe to the water grate connected to the boiler with a suitable pipe and cock, and *c* is an outlet pipe also connected to the boiler with a pipe and cock. There is
25 thus a constant circulation of water from the boiler by the pipe *b* into the water grate, and then by the pipe *c* back to the boiler. The inlet pipe *b* is carried along nearly to the inner end of the water grate, so as to insure perfect circulation of the water through the grate. The connections of the pipes *b* and *c* with the boiler are clearly seen in Figure 1 ;
30 *d*, *d*, are screwed brass plugs to be taken out when required to remove scale or deposit, and *e* is a hole for washing out the scale, this hole being made water-tight with a cover. In case of the water grate becoming damaged or eaten through when the boiler is at work, the communication with the boiler can be at once shut off by the cocks above
35 named.

And having now described the nature of my said Invention, and in what manner the same is to be performed, I declare that I claim, the

Thomas' Impts. in Ventilating Stoke Holes, Consuming Smoke, &c.

means or apparatus, substantially as herein-before described, by which the vitiated air is drawn or exhausted from the stoke hole, or other parts of the ship, and forced or sent by the same machine to the chimney to be heated, and from the chimney to the fire-places to support combustion and consume the smoke, all as herein-before explained. 5

In witness whereof, I, the said John Thomas, have hereunto set my hand and seal, this Eleventh day of January One thousand eight hundred and seventy-three.

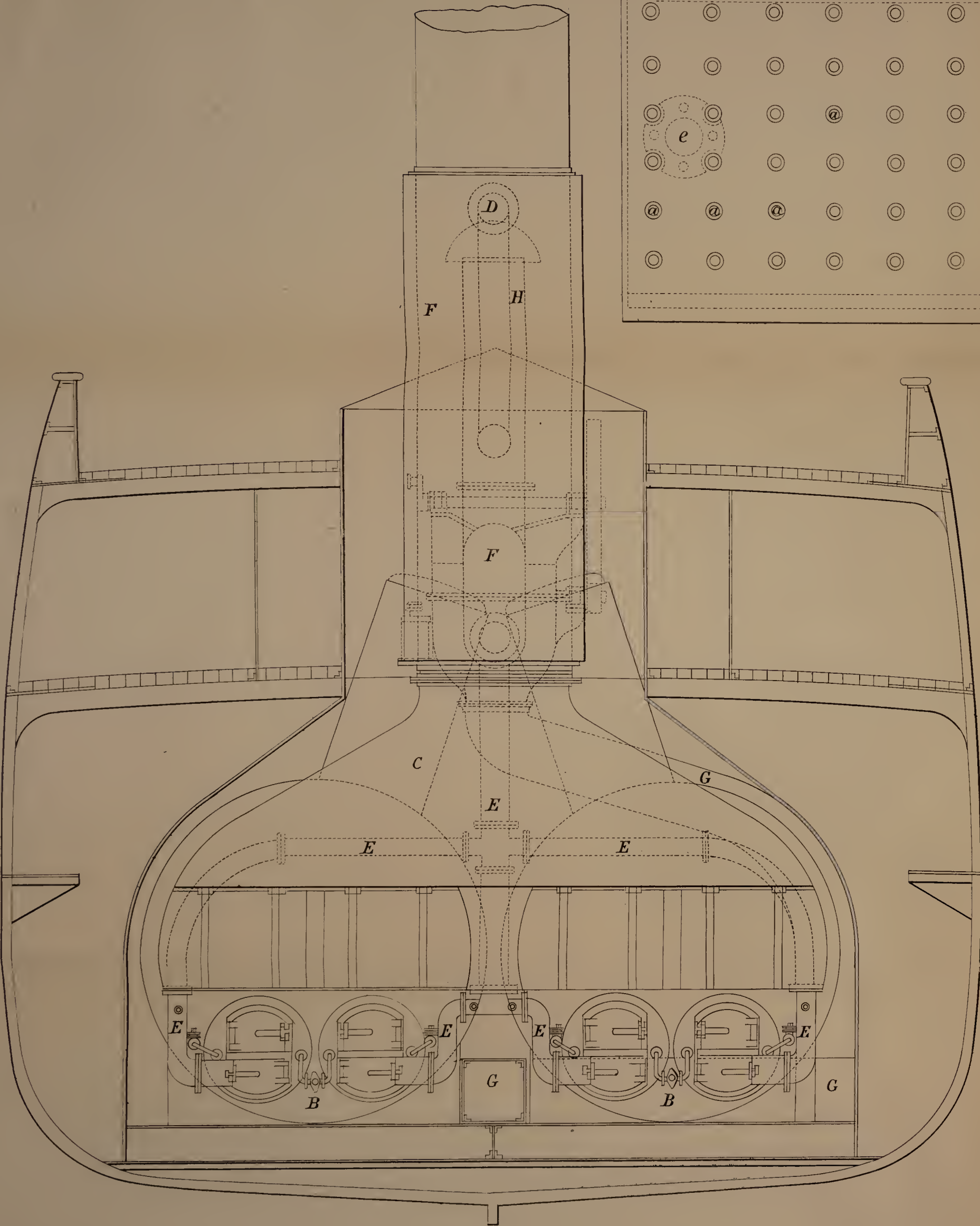
JOHN THOMAS. (L.S.)

LONDON:

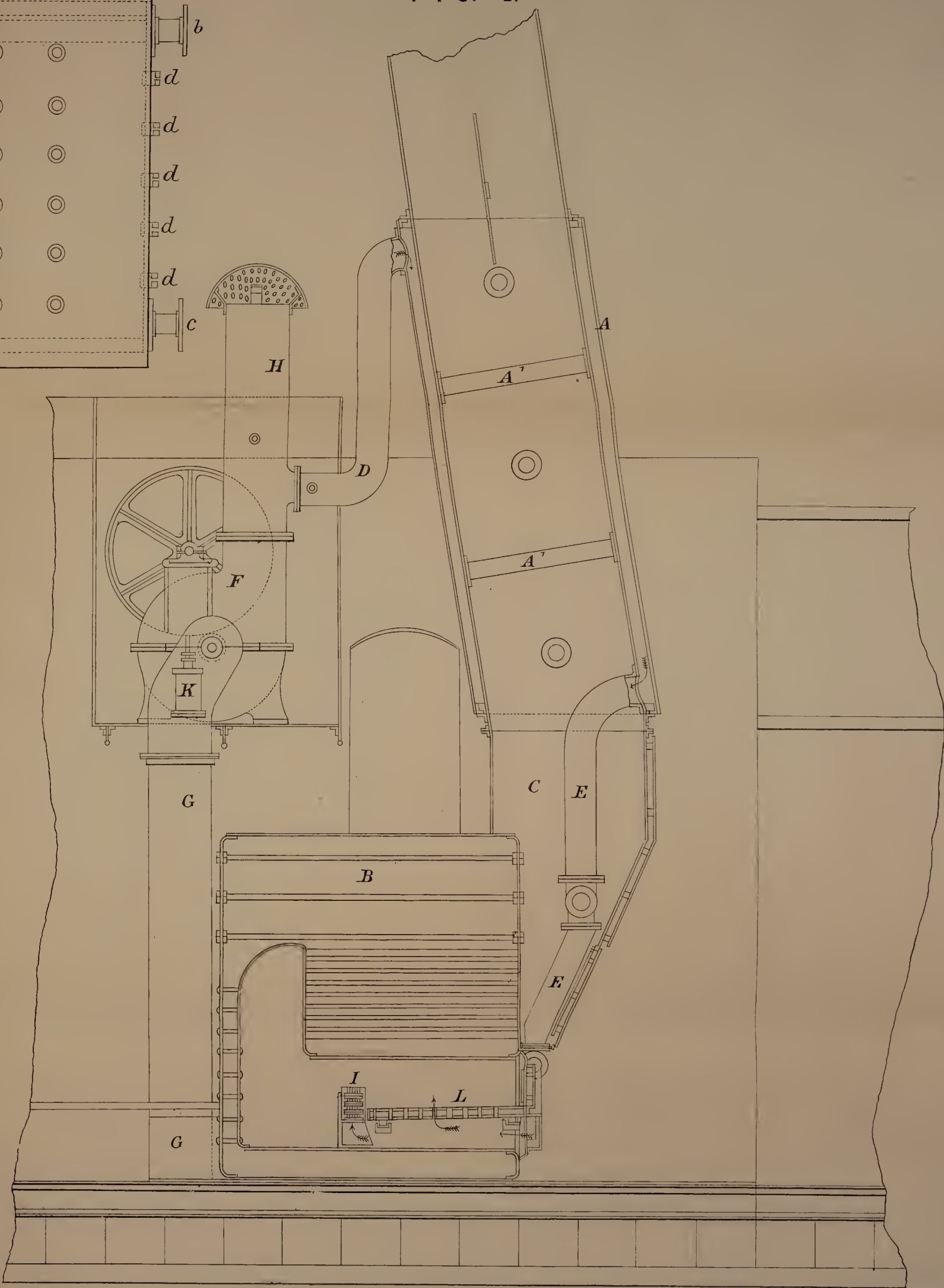
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1873.

F I C. 3.

F I C. 1.



F I C. 2.



The filed drawing is not colored.

Drawn on Stone by Malby & Sons

